

## Claims

1. A substrate processing system having coupling through a network between a substrate processing apparatus (3, 3A) discharging a processing solution onto a rotating substrate (W) to perform predetermined processing, and a computer (4) collecting data  
5 from said substrate processing apparatus, said substrate processing system comprising:

collection means (441) for monitoring and collecting a plurality of control elements in a specific step as one of processes of said predetermined processing in said substrate processing apparatus; and

abnormality detection means (442) for detecting a processing abnormality in  
10 said substrate processing apparatus based on said plurality of control elements collected by said collection means.

2. The substrate processing system according to claim 1,

wherein said specific step is a discharge step discharging said processing  
15 solution onto a rotating substrate, and

wherein said abnormality detection means detects a processing abnormality based on a combination of a plurality of control elements in said discharge step.

3. The substrate processing system according to claim 1,

20 wherein said substrate processing apparatus discharges a cleaning solution and thereafter discharges pure water onto a rotating substrate to perform cleaning of said substrate,

wherein said collection means monitors and collects a plurality of control elements in a cleaning solution spread step in which said cleaning solution is discharged  
25 and spread to coat a rotating substrate, and

wherein said abnormality detection means detects a processing abnormality in said cleaning based on a combination of two or more of said plurality of control elements in said cleaning solution spread step including the number of revolutions of a substrate, the temperature, flow rate and concentration of a cleaning solution, and cleaning solution  
5 discharge time.

4. The substrate processing system according to claim 3,  
wherein said collection means also monitors and collects a plurality of control elements in a pure water discharge step in which pure water is discharged onto a rotating  
10 substrate, and

wherein said abnormality detection means detects a processing abnormality in said cleaning based on a combination of two or more of said plurality of control elements in said pure water discharge step including the number of revolutions of a substrate, the flow rate of pure water and pure water discharge time.

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5. The substrate processing system according to claim 4,  
wherein said cleaning solution is a polymer removal solution,  
wherein said substrate processing apparatus discharges said polymer removal solution and thereafter discharges pure water onto a rotating substrate to perform polymer  
20 removal of said substrate,

wherein said collection means monitors and collects the flow rate and discharge time of a removal solution as a plurality of control elements in a removal solution spread step in which said polymer removal solution is discharged and spread to coat a rotating substrate, and

25 wherein said abnormality detection means detects a processing abnormality in

said polymer removal based on a combination of the flow rate and discharge time of said removal solution in said removal solution spread step.

5           6. The substrate processing system according to claim 4,  
          wherein said cleaning solution is an etching solution,  
          wherein said substrate processing apparatus discharges said etching solution  
and thereafter discharges pure water onto a rotating substrate to perform etching of said  
substrate,

10           wherein said collection means monitors and collects the concentration and  
discharge time of an etching solution as a plurality of control elements in an etching  
solution spread step in which said etching solution is discharged and spread to coat a  
rotating substrate, and

          wherein said abnormality detection means detects a processing abnormality in  
said etching based on a combination of the concentration and discharge time of said  
15   etching solution in said etching solution spread step.

          7. The substrate processing system according to claim 6,  
          wherein said etching solution is hydrofluoric acid.

20           8. The substrate processing system according to claim 6,  
          wherein said etching solution is hydrochloric acid.

          9. The substrate processing system according to claim 6,  
          wherein said substrate processing apparatus comprises a circulation mechanism  
25   (110) for collecting a spent etching solution discharged once onto a substrate to mix said

spent etching solution with a new etching solution for use in circulation.

10. The substrate processing system according to claim 9,  
wherein said etching solution is hydrofluoric acid.

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11. The substrate processing system according to claim 9,  
wherein said etching solution is hydrochloric acid.

12. A substrate processing system having coupling through a network between  
10 a substrate processing apparatus discharging a cleaning solution and thereafter  
discharging pure water onto a rotating substrate to performing cleaning of said substrate,  
and a computer collecting data from said substrate processing apparatus, said substrate  
processing system comprising:

abnormality detection means for detecting a processing abnormality in said  
15 cleaning based on a combination of two or more of the number of revolutions of a  
substrate, the temperature, flow rate and concentration of a cleaning solution, and  
cleaning solution discharge time in said cleaning.

13. The substrate processing system according to claim 12,  
20 wherein said abnormality detection means also detects a processing abnormality  
in said cleaning based on a combination of two or more of the number of revolutions of a  
substrate, the flow rate of pure water and pure water discharge time in said cleaning.

14. The substrate processing system according to claim 13,  
25 wherein said cleaning solution is a polymer removal solution,

wherein said substrate processing apparatus discharges said polymer removal solution and thereafter discharges pure water onto a rotating substrate to perform polymer removal of said substrate, and

wherein said abnormality detection means detects a processing abnormality in  
5 said polymer removal based on a combination of the flow rate and discharge time of a removal solution in said polymer removal.

15. The substrate processing system according to claim 13,

wherein said cleaning solution is an etching solution,

10 wherein said substrate processing apparatus discharges said etching solution and thereafter discharges pure water onto a rotating substrate to perform etching of said substrate, and

wherein said abnormality detection means detects a processing abnormality in  
said etching based on a combination of the concentration and discharge time of an etching  
15 solution in said etching.

16. The substrate processing system according to claim 15,

wherein said etching solution is hydrofluoric acid.

20 17. The substrate processing system according to claim 15,

wherein said etching solution is hydrochloric acid.

18. A substrate processing apparatus discharging a processing solution onto a rotating substrate to perform predetermined processing, comprising:

25 collection means for monitoring and collecting a plurality of control elements in

a specific step as one of processes of said predetermined processing; and

abnormality detection means for detecting a processing abnormality in said processes based on said plurality of control elements collected by said collection means.

5           19. The substrate processing apparatus according to claim 18,  
          wherein said specific step is a discharge step discharging said processing solution onto a rotating substrate, and  
          wherein said abnormality detection means detects a processing abnormality based on a combination of a plurality of control elements in said discharge step.

10           20. The substrate processing apparatus according to claim 19,  
          wherein said predetermined processing is cleaning by discharging a cleaning solution and thereafter discharging pure water onto a rotating substrate to clean said substrate,

15           wherein said collection means monitors and collects a plurality of control elements in a cleaning solution spread step in which said cleaning solution is discharged and spread to coat a rotating substrate, and

          wherein said abnormality detection means detects a processing abnormality in said cleaning based on a combination of two or more of said plurality of control elements  
20   in said cleaning solution spread step including the number of revolutions of a substrate, the temperature, flow rate and concentration of a cleaning solution, and cleaning solution discharge time.

          21. The substrate processing apparatus according to claim 20,  
25   wherein said collection means also monitors and collects a plurality of control

elements in a pure water discharge step in which pure water is discharged onto a rotating substrate, and

wherein said abnormality detection means detects a processing abnormality in said cleaning based on a combination of two or more of said plurality of control elements in said pure water discharge step including the number of revolutions of a substrate, the  
5 flow rate of pure water and pure water discharge time.

22. The substrate processing apparatus according to claim 21,

wherein said cleaning solution is a polymer removal solution,

10 wherein said predetermined processing is polymer removal by discharging said polymer removal solution and thereafter discharging pure water onto a rotating substrate to clean said substrate,

wherein said collection means monitors and collects the flow rate and discharge time of a removal solution as a plurality of control elements in a removal solution spread  
15 step in which said polymer removal solution is discharged and spread to coat a rotating substrate, and

wherein said abnormality detection means detects a processing abnormality in said polymer removal based on a combination of the flow rate and discharge time of said removal solution in said removal solution spread step.

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23. The substrate processing apparatus according to claim 21,

wherein said cleaning solution is an etching solution,

wherein said predetermined processing is etching by discharging said etching solution and thereafter discharging pure water onto a rotating substrate to clean said  
25 substrate,

wherein said collection means monitors and collects the concentration and discharge time of an etching solution as a plurality of control elements in an etching solution spread step in which said etching solution is discharged and spread to coat a rotating substrate, and

5            wherein said abnormality detection means detects a processing abnormality in said etching based on a combination of the concentration and discharge time of said etching solution in said etching solution spread step.

10           24. The substrate processing apparatus according to claim 23,  
             wherein said etching solution is hydrofluoric acid.

25. The substrate processing apparatus according to claim 23,  
             wherein said etching solution is hydrochloric acid.

15           26. The substrate processing apparatus according to claim 23, comprising:  
             a circulation mechanism for collecting a spent etching solution discharged once onto a substrate to mix said spent etching solution with a new etching solution for use in circulation.

20           27. The substrate processing apparatus according to claim 26,  
             wherein said etching solution is hydrofluoric acid.

28. The substrate processing apparatus according to claim 26,  
             wherein said etching solution is hydrochloric acid.

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29. A substrate processing apparatus discharging a processing solution and thereafter discharging pure water onto a rotating substrate to perform cleaning of said substrate, comprising:

abnormality detection means for detecting a processing abnormality in said  
5 cleaning based on a combination of two or more of the number of revolutions of a substrate, the temperature, flow rate and concentration of a cleaning solution, and cleaning solution discharge time in said cleaning.

30. The substrate processing apparatus according to claim 29,  
10 wherein said abnormality detection means also detects a processing abnormality in said cleaning based on a combination of two or more of the number of revolutions of a substrate, the flow rate of pure water and pure water discharge time in said cleaning.

31. The substrate processing apparatus according to claim 30,  
15 wherein said cleaning solution is a polymer removal solution,  
wherein said substrate processing apparatus discharges said polymer removal solution and thereafter discharges pure water onto a rotating substrate to perform polymer removal of said substrate, and

wherein said abnormality detection means detects a processing abnormality in  
20 said polymer removal based on a combination of the flow rate and discharge time of a removal solution in said polymer removal.

32. The substrate processing apparatus according to claim 30,  
wherein said cleaning solution is an etching solution,  
25 wherein said substrate processing apparatus discharges said etching solution

and thereafter discharges pure water onto a rotating substrate to perform etching of said substrate, and

wherein said abnormality detection means detects a processing abnormality in said etching based on a combination of the concentration and discharge time of an etching solution in said etching.

33. The substrate processing apparatus according to claim 32,  
wherein said etching solution is hydrofluoric acid.

10 34. The substrate processing apparatus according to claim 32,  
wherein said etching solution is hydrochloric acid.

35. The substrate processing apparatus according to claim 32, comprising:  
a circulation mechanism for collecting a spent etching solution discharged once  
15 onto a substrate to mix said spent etching solution with a new etching solution for use in  
circulation.

20 36. The substrate processing apparatus according to claim 35,  
wherein said etching solution is hydrofluoric acid.

37. The substrate processing apparatus according to claim 35,  
wherein said etching solution is hydrochloric acid.

38. A program for a computer included in a substrate processing apparatus  
25 discharging a cleaning solution and thereafter discharging pure water onto a rotating

substrate to perform cleaning of said substrate,

wherein execution of said program by said computer causes said substrate processing apparatus to detect a processing abnormality in said cleaning based on a combination of two or more of the number of revolutions of a substrate, the temperature,  
5 flow rate and concentration of a cleaning solution, and cleaning solution discharge time in said cleaning.

39. A computer-readable recording medium recording a program for a computer included in a substrate processing apparatus discharging a cleaning solution and  
10 thereafter discharging pure water onto a rotating substrate to perform cleaning of said substrate,

wherein execution of said program by said computer causes said substrate processing apparatus to detect a processing abnormality in said cleaning based on a combination of two or more of the number of revolutions of a substrate, the temperature,  
15 flow rate and concentration of a cleaning solution, and cleaning solution discharge time in said cleaning.